CB Technology for the Joint Warfighter

Colonel Ben Hagar
Joint Science & Technology Office
CB Defense Directorate, DTRA

SOCOM CBRN Conference
14 Dec 04

Making the World Safer

JSTO- the S&T component of the Chem-Bio Defense Program

OSD provides oversight

- Combatant Commanders
- Services

Joint Requirements Office (JRO)

Joint Combat Developer

Required Capabilities

JFOCS

Prioritized

Test and Evaluation Executive

S&T Gaps

Joint Science & Technology Office DTRA/CB

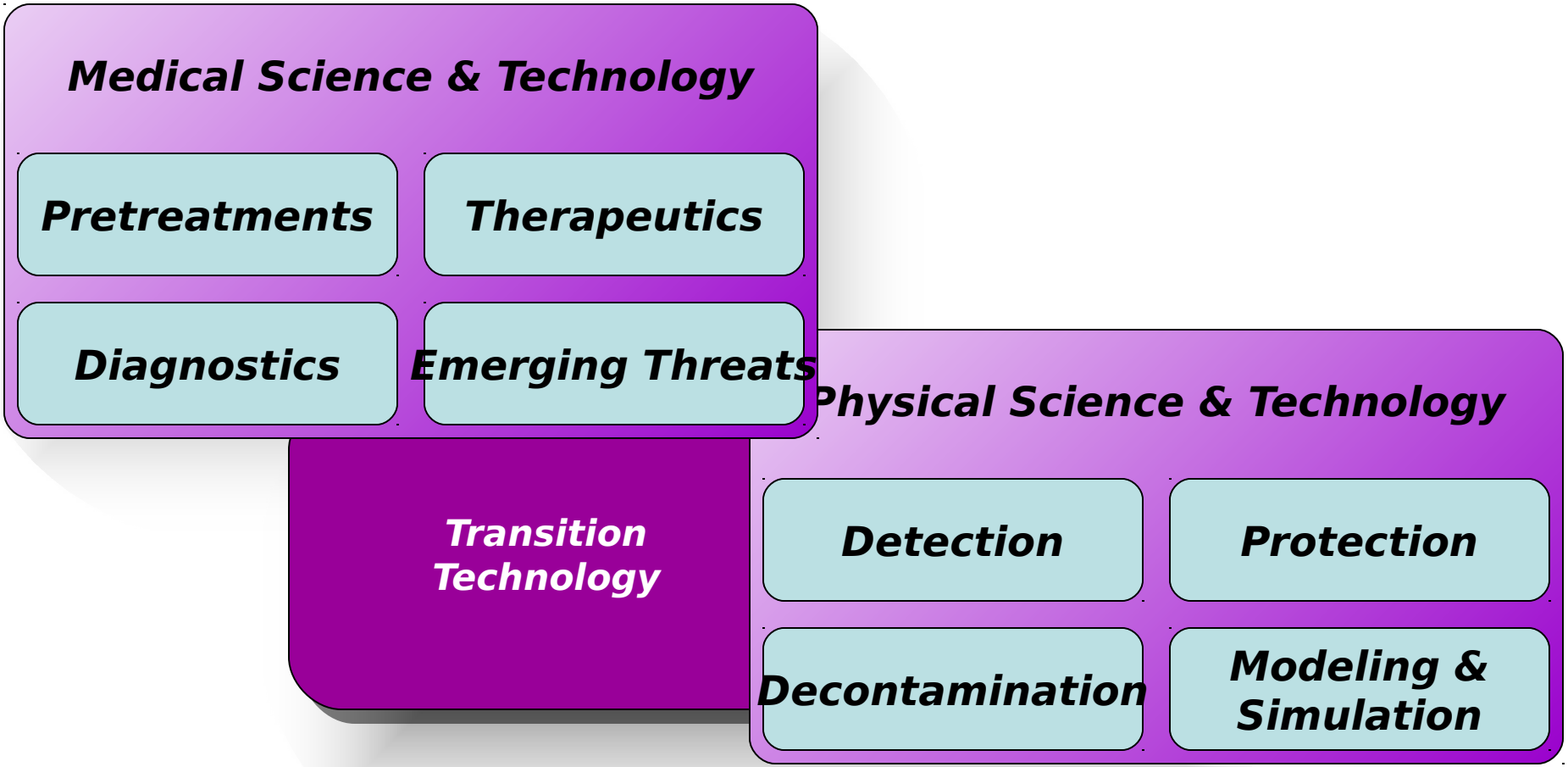
Joint Program Executive Office (JPEO)

Solutions

Mature Technologies

Making the World Safer

Managed by Technology Capability Areas



Making the World Safer

Leveraging the best in class from across the spectrum of performe

Academia

Industry

Service Labs

DHS and DHHS

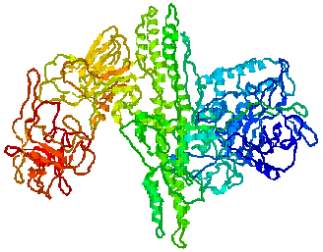
DARPA

Internatio
nal
Partners

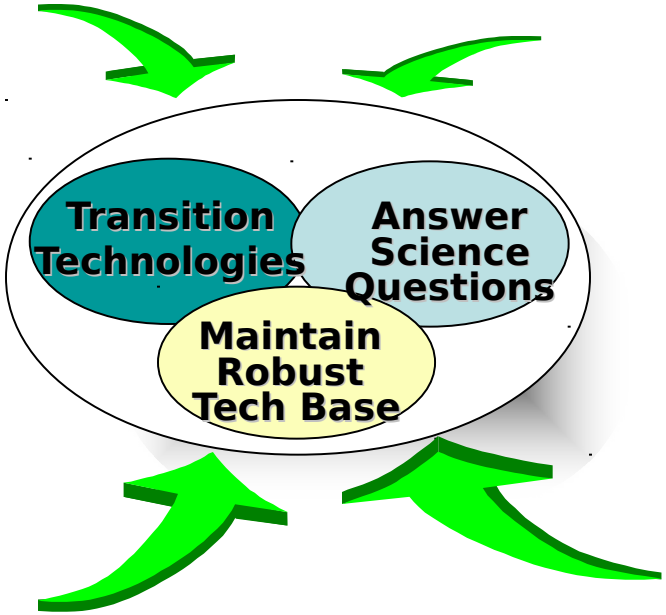
Making the World Safer

Preserving warfighter effectiveness through medical countermeasures

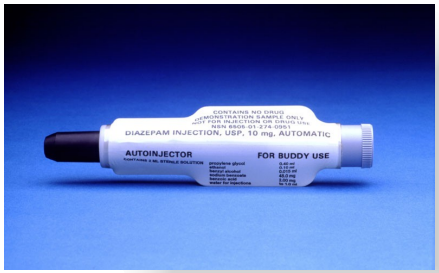
Pretreatments/ Prophylaxes



Emerging Threats/ Special Programs



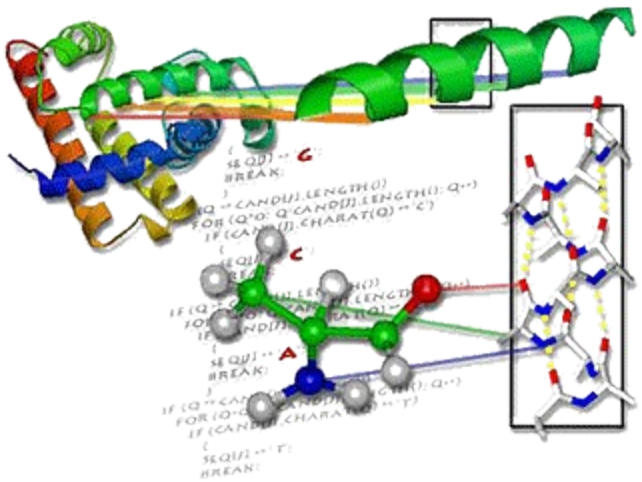
Diagnostics



Therapeutics

DTRA
Making the World Safer

A systems biology approach will yield novel pretreatments

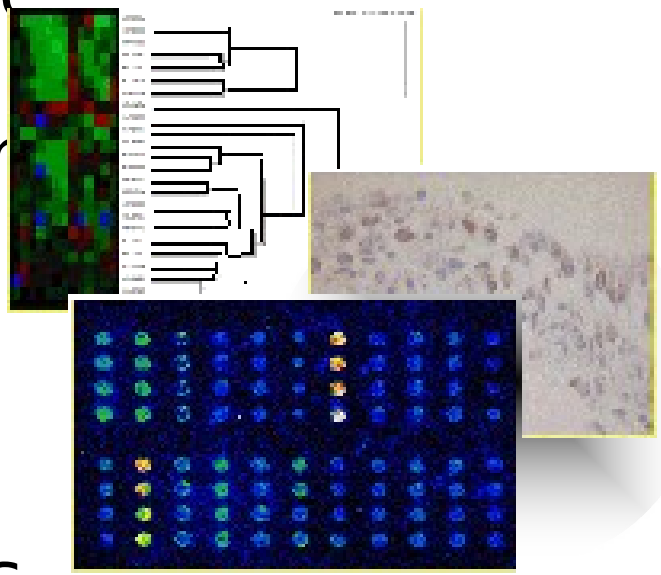


- **Non-living vectors for multi-valent and multi-agent pretreatments**
- **Non-injection methods of vaccine delivery**
- **Chemical agent bio-scavenger**

Making the World Safer

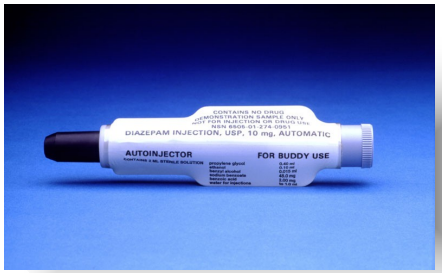
Lab diagnostic assays for use in forward battlespace areas

- DNA arrays and proteomic analysis to identify exposure before symptoms arise
- Molecular (nano) fabrication methods to make ultra-miniaturized “lab-on-chip” applications

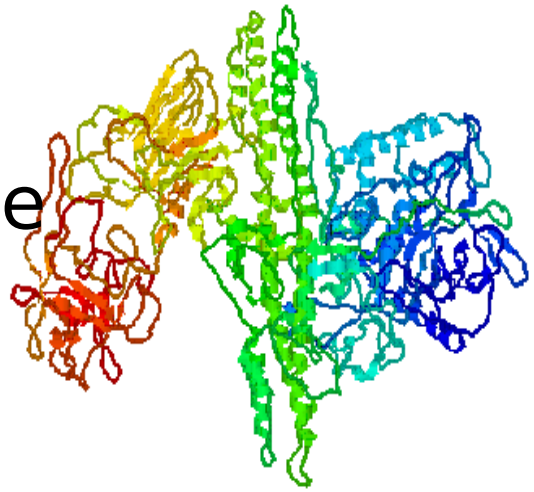


New opportunities for intervention

- Antimicrobials and immunotherapies effective against bacterial, viral, and toxin agents
- Identify common biological mechanisms how agents cause injury
  - Design non-specific and broad spectrum treatments effective against whole classes of threat agents



Emerging Threats – Anticipating the unknown

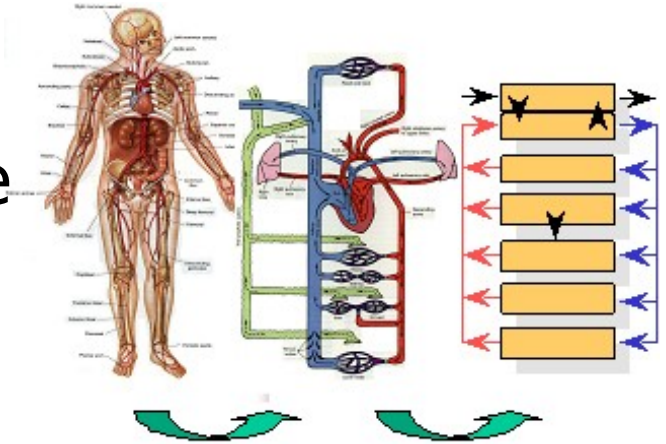


- Develop countermeasures against non-traditional nerve agents
- Develop identification techniques and countermeasures for genetically modified biological threat agents
  - Rapid re-sequencing capability and bio-informatics

Special Project – Low-Level

Operational Toxicology

- Addresses deficiencies in current understanding of operational CWA exposure
- Defendable criteria for detection, protection, decontamination, and countermeasure technologies
- Valid and defendable toxicity data is the foundation for every Baseline Capability



Preserving warfighter effectiveness with advanced equipment and materials

Protection

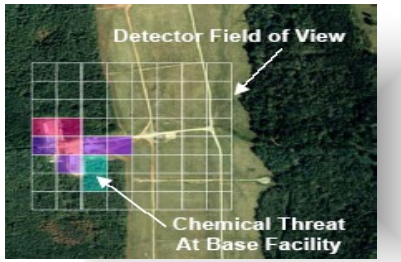
Detection

Decontamination

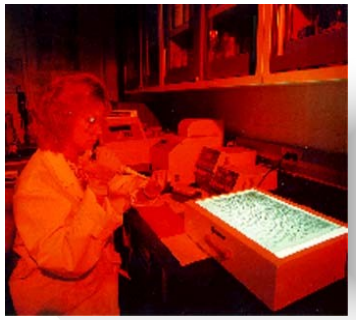
Transition Technologies

Answer Science Questions

Maintain Robust Tech Base



Modeling and Simulation

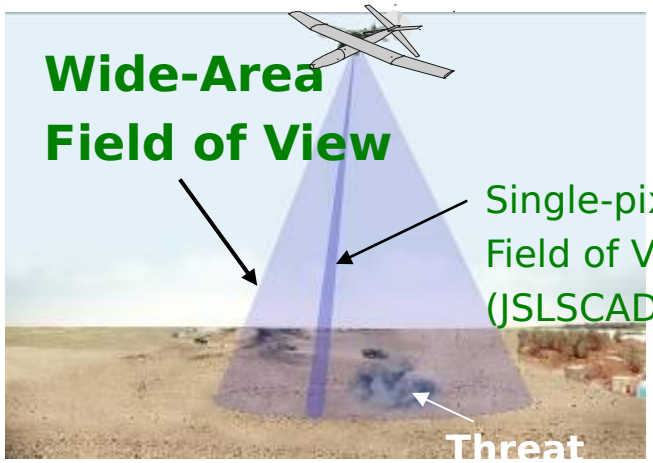


Supporting S&T

Making the World Safer

Collecting information, not just detecting

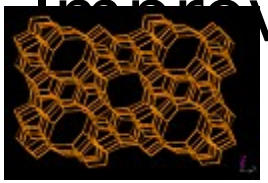
- Wide-Area Aerial Recon
  - Expand/new signatures for existing technologies
  - Increase discrimination
  - Reduce false alarms
- Multiplex Assays
  - Minimize consumables
  - Reduce response time and logistical burden

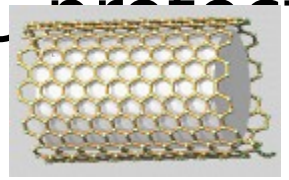


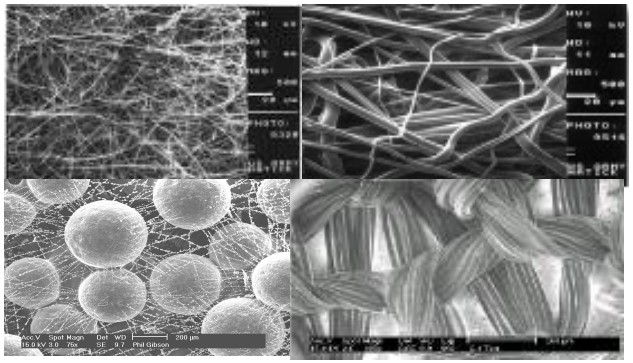
Making the World Safer

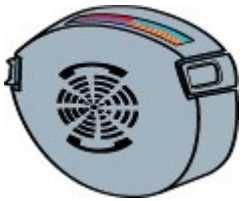
New approaches to limiting exposure

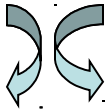
- Develop monolayered reactive materials
- Investigate materials for self-detoxification and increased aerosol protection
- Improve TIC protection

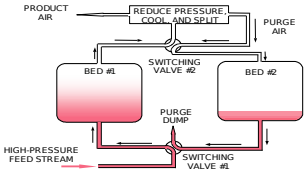












Making the World Safer

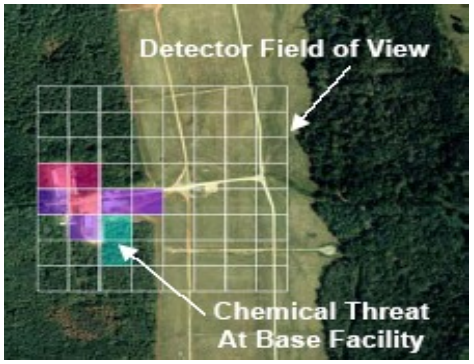
A single decontamination solution for all agents remains a formidable challenge

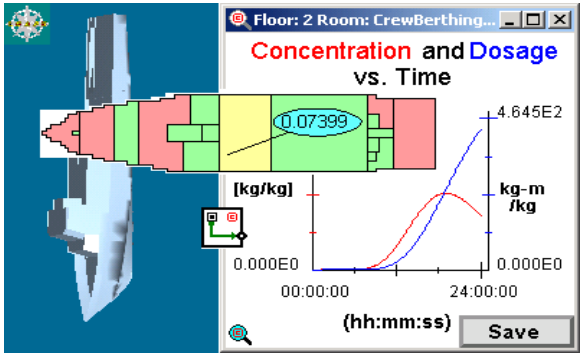
- Focus on technology for
  - Interiors
  - Sensitive equipment
  - Aircraft exteriors

- Still struggling with basic science for decon and materials compatability

Modeling and Simulation will improve decision making

- Sensor integration and decision support tools for warfighter's common operating picture
- Algorithms for aerosol agents in urban areas and inside buildings
- Live weather feeds for predictive models

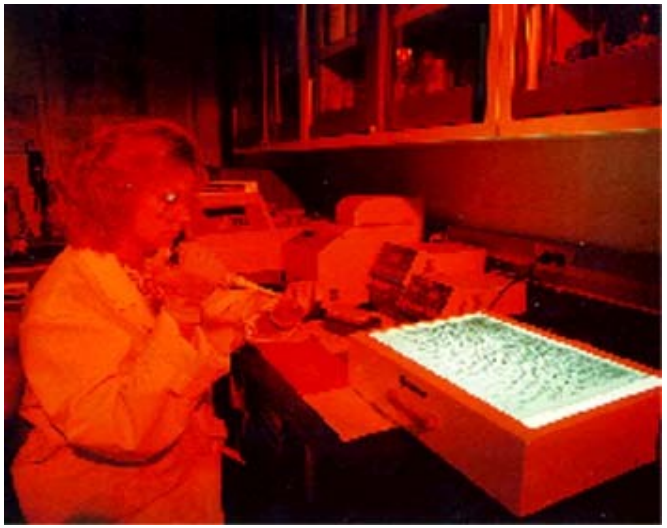




Making the World Safer

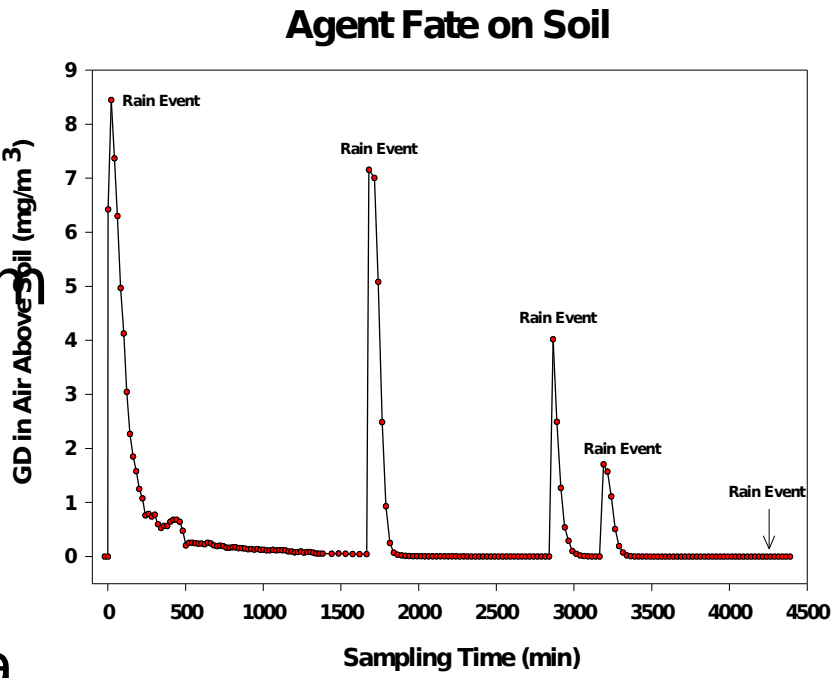
Many aspects of underlying science must still be investigated

- Understand environmental fate of chemical and biological agent
- Develop artificial chemical and biological simulants



For Example: How does agent actually behave on surfaces?

- Study persistence of CW agents on military operational surfaces (e.g., concrete, asphalt) to inform
  - Operational/Risk Management
  - Command decisions
  - Other S&T efforts
- Generate/validate data via field, lab and wind tunnel studies
- Create modeling tools to support decision making

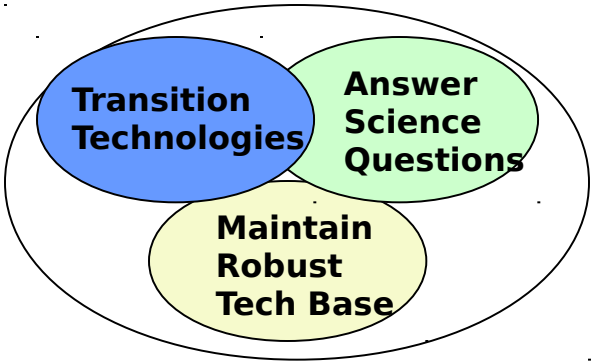


Making the World Safer

We use demonstrations to assess technologies

Biological Network (BIONET)

CBRN Unmanned Ground Reconnaissance (CUGR)



Contamination Avoidance at Seaports of Debarkation (CASPOD)

Large Frame Aircraft Decontamination Demonstration

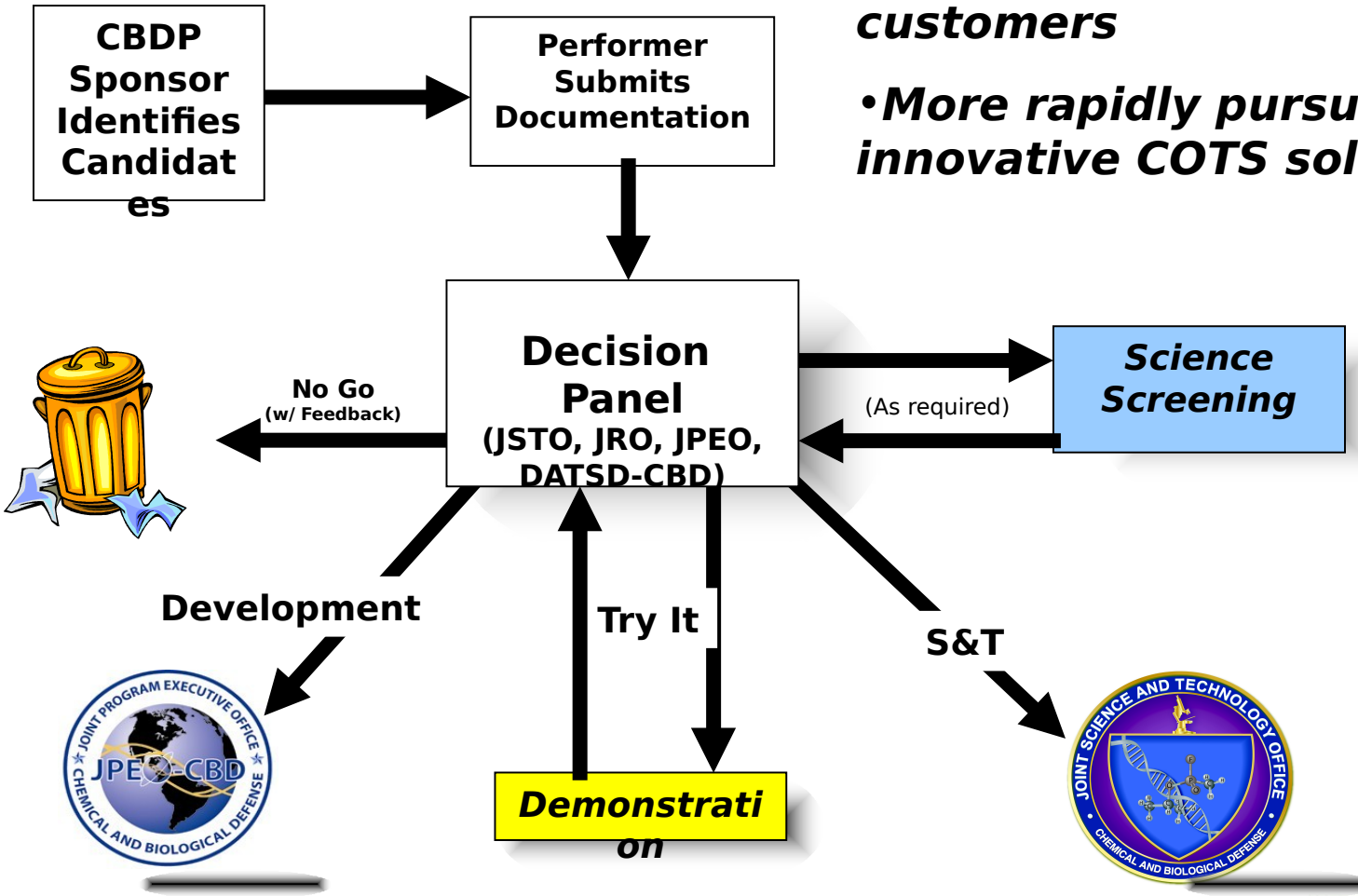
SOCOM Relevence

Joint Service Installation Pilot Project (JSIPP)

DTRA
Making the World Safer

Rapid Start Initiative (RSI) Process

- ***Enhanced responsiveness to customers***
- ***More rapidly pursue innovative COTS solutions***



Making the World Safer

Developing and delivering technology to field enhanced capabilities

Medical Science & Technology

Physical Science & Technology

Maintain Robust Tech Base

Answer Science Questions

Transition Technologies

Alignment

Army

Navy

TRANSITION

Products for the Joint Warfighter

Marine

Air Force

Making the World Safer

Technology for the Joint Warfighter

- Develop and execute an agile, flexible, and robust S&T program to meet validated needs
- Seek out “best-in-class” performers to pursue innovative solutions
- Push to ensure effective technology to the soldier, sailor, airman, and marine